

WHAT IS CLAIMED IS:

1. A method for manufacturing a microlens array

comprising:

a first step of producing a first microlens array;

a second step of forming a layer made of a photosensitive material; and

a third step of forming a second microlens array by irradiating the first microlens array with parallel light that has an intensity distribution responsive to a shape of the second microlens array and irradiating the layer made of the photosensitive material with transmission light that is transmitted by the first microlens array.

2. The method of claim 1, wherein the photosensitive material is a photosensitive resin and the second microlens array is formed by irradiating and exposing the layer made of this photosensitive resin to the transmission light.

3. The method of claim 1, wherein by causing a mask member which has a preset light transmittance distribution to transmit the parallel light, the intensity distribution is given.

4. The method of claim 1, wherein:

at the first step, the first microlens array is produced by the use of a stamper mold which has a shape responsive to a shape of the first microlens array;

after the second step, at the third step, the first microlens array is irradiated with the parallel light that has an intensity distribution responsive to a shape of the second microlens array, via a mask member which is formed into one piece with the stamper mold; and

the layer made of a photosensitive material is irradiated with the transmission light transmitted by the first microlens array, whereby the second microlens array is formed.

5. The method of claim 3, wherein the mask member is formed by applying a material which changes transmittance of light of a specific wavelength to a light-transmitting board.

6. The method of claim 4, wherein the mask member is formed by applying a material which changes transmittance of light of a specific wavelength to a light-transmitting board.

7. The method of claim 4, wherein after the first

microlens array is produced by the use of the stamper mold at the first step, the second microlens array is formed as the first microlens array and the stamper mold are kept in one piece.

8. A microlens array comprising :

a first microlens array disposed to one end face in a thickness direction; and

a second microlens array disposed to another end face in the thickness direction and formed into a cylindrical shape.

9. A microlens array comprising:

a first microlens array disposed to one end face in a thickness direction thereof; and

a second microlens array disposed to another end face in the thickness direction and formed into an aspheric shape.

10. A microlens array manufactured by the methods of manufacturing microlens arrays of claim 1.

11. A projection-type liquid crystal display apparatus comprising:

a liquid crystal display element; and

the microlens array of claim 8 that causes light from a light source to converge to a pixel position of the liquid crystal display element.

12. A projection-type liquid crystal display apparatus comprising:

a liquid crystal display element; and

the microlens array of claim 9 that causes light from a light source to converge to a pixel position of the liquid crystal display element.

13. The apparatus of claim 11, further comprising:

a light source; and

light flux separating means for separating a white light flux from the light source into a plurality of light fluxes,

wherein the liquid crystal display element transmits the plural light fluxes separated by the light flux separating means, and selectively changes intensity distributions of these light fluxes.

14. The apparatus of claim 12, further comprising:

a light source; and

light flux separating means for separating a white

light flux from the light source into a plurality of light fluxes,

wherein the liquid crystal display element transmits the plural light fluxes separated by the light flux separating means, and selectively changes intensity distributions of these light fluxes.

15. An apparatus for manufacturing a microlens array, comprising:

a stamper mold for forming a first microlens array, the stamper mold having a shape responsive to a shape of the first microlens array; and

a mask member for forming a second microlens array, the mask member having a preset light transmittance distribution,

the stamper mold and the mask member being formed into one piece.